

I claim:

1. Electronic equipment comprising:
  - a board including an on-board memory area for installing on-board type memory modules, and a slot-type memory area for installing slot-type memory modules;
  - at least one on-board type memory module installed in the on-board memory area, each on-board type memory module having a specified operating frequency;
  - at least one memory slot provided in the slot-type memory area, each memory slot being coupled in series to the on-board memory module;
  - at least one slot-type memory module, installed in the memory slot in the slot-type memory area, each slot-type memory module having a specified operating frequency;
  - a memory controller coupled in series to the on-board memory and slot-type memory modules, the memory controller providing access using a designated operating frequency; and
  - a memory bus that couples the memory controller to the on-board memory and slot-type memory modules in series.
2. The electronic equipment of claim 1, further comprising a frequency controller that designates the operating frequency of the memory bus.
3. The electronic equipment of claim 2, wherein the frequency controller designates the specified operating frequency of the slot-type memory module as the operating frequency for both the on-board memory and slot-type memory modules, when the operating frequency of the on-board memory module is different than the operating frequency of the slot-type memory module.
4. The electronic equipment of claim 2, wherein the frequency controller designates the specified operating frequency of the on-board memory module as the operating frequency for both the on-board memory and slot-type memory modules, when the operating frequency of the on-board memory module is different than the operating frequency of the slot-type memory module.
5. The electronic equipment of claim 2, further comprising an input mechanism for designating whether to use the specified operating frequency of the on-board memory module or the slot-type memory module, when the operating frequency of the on-board memory module is different than the operating frequency of the slot-type memory module.

6. The electronic equipment of claim 5, wherein the frequency controller designates the specified operating frequency of the slot-type memory module as the operating frequency for both the on-board memory and slot-type memory modules, when the operating frequency of the on-board memory module is different than the operating frequency of the slot-type memory module.

7. The electronic equipment of claim 5, wherein the frequency controller designates the specified operating frequency of the on-board memory module as the operating frequency for both the on-board memory and slot-type memory modules, when the operating frequency of the on-board memory module is different than the operating frequency of the slot-type memory module.

8. The electronic equipment of claim 1, further comprising notification to a user when the memory controller detects a defective one of the on-board and slot-type memory modules.

9. A method for manufacturing electronic equipment that includes a plurality of memory modules coupled in series, comprising the steps of:

providing an on-board memory area including at least one on-board type memory module in the electronic equipment;

providing a slot-type memory area including at least one memory slot, each memory slot being coupled to the on-board memory in series;

installing at least one slot-type memory module in the at least one memory slot; and

providing a memory controller, coupled in series to the on-board memory and slot-type memory, that controls access to the on-board and slot-type memory modules.

10. The method of claim 9, wherein each on-board type memory module is directly installed on a board in the electronic equipment and each slot-type memory module installed in a memory slot has attribute information; further comprising the steps of:

determining whether a defective memory module is included among the on-board and slot-type memory modules based on the attribute information of the respective on-board and slot-type memory modules; and

controlling start-up operation of the electronic equipment based on the determination.

11. A method for controlling start-up operation of electronic equipment having an on-board type memory module and a slot receiving a slot-type module, each of the on-board type and slot-type modules having attribute information, comprising the steps of:

trying to read the attribute information of the on-board type and slot-type modules;  
determining whether one of the on-board type and slot-type memory modules is defective based on the attribute information; and  
controlling a start-up operation of the electronic equipment based on the determination.

12. Electronic equipment, comprising:

an on-board type memory module installed on a board;  
at least one memory slot provided on the board, the memory slot coupled in series to the on-board type memory module;  
a memory controller, coupled in series to the on-board type memory module and the at least one memory slot.